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EVERGREEN ENVIRONMENTAL MANAGEMENT, INC.

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REGION

SUB-SURFACE SOIL & CATCH BASIN DEBRIS SAMPLING

FRED DEVINE DIVING & SALVAGE FACILITY
6211 N. ENSIGN STREET
PORTLAND, OREGON 97217

ENV 01-06

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EVERGREEN ENVIRONMENTAL MANAGEMENT, INC.

Post Office Box 1604 / Beaverton, Oregon 97075 - 1604 / Telephone (503) 985-1717 / Fax (503) 985-1718 / OR CCB# 142639

R E C E I V E D
AUG 27 2002

DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

SUB-SURFACE SOIL & CATCH BASIN DEBRIS SAMPLING

FRED DEVINE DIVING & SALVAGE FACILITY
6211 N. ENSIGN STREET
PORTLAND, OREGON 97217

ENV 01-06

Prepared For:

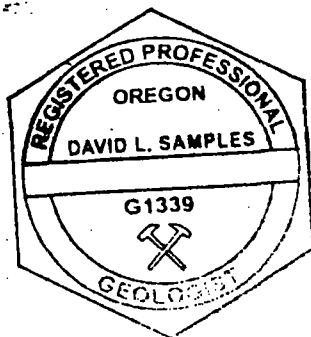
Mr. Mick Leitz
Fred Devine Diving & Salvage
6211 N. Ensign Street
Portland, OR 97217

Prepared By:

EVERGREEN ENVIRONMENTAL MANAGEMENT, INC.



DAVID L. SAMPLES R.G.
Registered Geologist No. G1339



August 26, 2002

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Post Office Box 1604 / Beaverton, Oregon 97075 - 1604 / Telephone (503) 985-1717 / Fax (503) 985-1718 / OR CCB# 142639

August 26, 2002

Mr. Mark Pugh
Oregon Dept. of Environmental Quality
Waste Management and Cleanup Division
811 SW Sixth Avenue
Portland, OR 97204

Re: Sub-Surface Soil and Catch Basin Debris Sampling at the
Fred Devine Diving & Salvage Facility, 6211 N. Ensign Street,
Portland, Oregon

Dear Mr. Pugh:

As requested by the Oregon Department of Environmental Quality (DEQ), Evergreen Environmental Management, LLC (EEM) has conducted sub-surface soil and catch basin debris sampling work at the Fred Devine Diving & Salvage (FDDS) facility located at 6211 N. Ensign Street in Portland, Oregon, to comply with the sampling request outlined in your letter dated April 11, 2002, and also discussed during your site visit on April 18, 2002 (Figures 1, 2, 3 and 4). DEQ requested the sampling data following their review of EEM's Preliminary Assessment report for the FDDS facility dated June 28, 2001.

Catch Basin Sampling

The locations of the catch basins sampled are indicated in Figure 2. Each catch basin was approximately two feet two inches wide and two feet nine inches deep and had approximately one to two inches of solid material on the bottom. According to Mr. Marvin Smith, the Operations Manager for FDDS, the catch basins were last cleaned out in October of 2001 by FDDS personnel and the residue was disposed of by Foss Environmental. FOSS is a tenant of the FDDS facility. Therefore, it is apparent that in a nine month period which included the entire rainy season, only approximately two inches of debris have accumulated in each catch basin.

On April 30, 2002, FDDS employees removed the grates from Catch Basins #1, #3, #4 and #6, removed the absorbent booms and pumped out the standing water. An occasional very slight sheen was observed when the water and solids were stirred up during the pumping of Catch Basins #1, #3 and #4. These three catch basins are located adjacent to the maintenance and warehouse structures and the dock entrance ramp.

EEM subsequently removed enough solids material from the bottom of each basin to fill two 9 ounce glass sampling jars. The solids in the bottom of Catch Basins #1, #3 and #4, appeared to be comprised of dirt and decaying organic debris. The material in the bottom of Catch Basin #6, which is adjacent to the office area, was almost all organic debris from the numerous trees and bushes in the immediate area. No materials such as paint chips were observed in any of the catch basins.

The catch basins were subsequently cleaned following EEM's sampling work and new absorbent booms were placed in them.

Sub-Surface Soil Sampling

On May 1, 2002, EEM collected sub-surface soil samples from four locations in the western portion of the FDDS property. The sampling locations had been previously selected by DEQ. Following your written and followup verbal requests, the soil samples were collected from the soil immediately below the layers of accumulated gravel. The locations of the sampling locations are shown in Figure 2. The sampling locations were measured from the southwest corner of the shop building.

west Soil Sample #1 was collected at a gravel covered location 94 feet *North* west and 6 feet north of the southwest corner of the shop building. DEQ requested a sample in this area because it was near the center of the open gravel covered area and it was also where a protective shelter was once located. EEM removed approximately six inches of compacted gravel before finding brown hard dry clayey soil. No unusual odors or visual indications of petroleum products or chemicals were observed in the removed gravel or soil. EEM collected two 9 ounce jars of the soil.

North? Soil Sample #2 was collected at a gravel covered location 51 feet west and 27 feet south of the southwest corner of the shop building. DEQ requested a sample in this area because it was immediately adjacent to the edge of the asphalt covered area. EEM removed approximately 15 inches of compacted gravel before finding dark brown silty sand soil. No unusual odors or visual indications of petroleum products or chemicals were observed in the removed gravel or soil. EEM collected two 9 ounce jars of the soil.

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✓ Soil Sample #3 was collected at a gravel covered location 165 feet west and 38 feet south of the southwest corner of the shop building. DEQ requested a sample in this area because it was several feet west of the edge of the asphalt covered area and next to where the equipment shelter once located in the center of the gravel covered area was now located. EEM removed approximately 7 inches of compacted gravel before finding brown silty sand soil. No unusual odors or visual indications of petroleum products or chemicals were observed in the removed gravel or soil. EEM collected two 9 ounce jars of the soil.

✓ Soil Sample #4 was collected at a gravel covered location 212 feet west and 32 feet south of the southwest corner of the shop building. DEQ requested a sample in this area because it was where surface drainage from some of the FDDS property and also part of the immediately adjacent Navy and Marine Corp Reserve facility flowed to the south and down the steep bank to the lagoon. EEM removed approximately 8 inches of compacted gravel before finding dark brown silty sand soil. No unusual odors or visual indications of petroleum products or chemicals were observed in the removed gravel or soil. EEM collected two 9 ounce jars of the soil.

Laboratory Analytical Results

The samples of the solid materials collected from the four catch basins and the four sub-surface soil samples were submitted to Environmental Services Laboratory (ESL) in Durham, Oregon, for analyses for the presence of Total Arsenic, Cadmium, Copper, Lead and Zinc, as well as Semi-Volatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs). The reported analytical results are summarized in Table 1. Copies of the laboratory reports and the Chain-of-Custody are attached.

PCBs

The laboratory reports did not indicate the presence of PCBs in the soil and catch basin debris samples.

Semi-Volatile Organic Compounds

The laboratory reports indicated the presence of various concentrations of Semi-Volatile Organic Compounds (SVOCs) in soil sample SS #1, and in the debris from the three catch basins (#1, #3 and #4) located adjacent to the maintenance and warehouse structures.

According to information provided by a Chemist at Environmental Services Laboratory, the Bis(2-ethylhexyl) phthalate (DEHP) detected in three of the catch basins and one of the soil samples is a chemical that is used in formation of plastics and other products and is often detected in soil samples from various unrelated locations. According to information from the EPA web site, DEHP is used in the production of polyvinyl chloride (PVC) and vinyl chloride resins. Exposure to this chemical can be from numerous diverse sources such as food which has had DEHP migrate into it from plastics during processing and storage, as well as drinking water, and a newly painted room or a room with newly installed flooring.

Bis(2-chloroisopropyl)ether was detected only in the catch basin #2 debris sample. According to information from EPA's and other web sites, this chemical is produced as a solvent and soil fumigant and is also formed in large quantities as a by-product in some propylene glycol production process. Therefore, it appears that detecting this chemical in the soil at industrial and other sites is also common. No

The anthracene, fluoranthene, fluorene, phenanthrene and pyrene found in debris from Catch Basins #3 and #4 are common constituents of petroleum products such as motor oil. These chemicals are probably from dripped oil from motor vehicles.

Total Metals

The laboratory reports indicated the presence of minor concentrations of arsenic, cadmium, copper, lead and zinc in nearly all of the soil and catch basin debris samples.

A comparison of the concentrations of the total metals detected in the catch basin samples and the sub-surface soil samples indicates the range of concentrations for arsenic and cadmium are very similar for both sampling locations. The range of concentrations of copper, lead and zinc are generally higher in the catch basin samples.

Total Metals	Catch Basin Samples ppm	Sub-Surface Soil samples ppm
Arsenic	2.71 to 16.7	2.12 to 17.9
Cadmium	ND to 3.47	ND to 1.45
Copper	85.5 to 206	19.7 to 98.8
Lead	66.6 to 253	3.59 to 57.6
Zinc	236 to 488	47.7 to 288

With regard to the detected metals in the sub-surface soil samples, it must be remembered that the whole area was built up from dredged sediments from the Willamette River in the early 1940s. The attached 1942 aerial photograph shows the dredge vessel in the Willamette River and its discharge pipe dumping sediments in the project site area. Since the sub-surface soil samples were collected at a depth below several inches to over a foot of gravel, and in an open area where equipment was stored, it appears unlikely that the soil has been subject to impact by industrial or commercial activities. Therefore, the range of total metals detected in the sub-surface soil samples may be typical for the Mocks Bottom area.

With regard to the detected metals in the catch basin debris samples, the sources of the metals can obviously be varied. They may include washed in local soil, soil brought in from off site by vehicle tires, material from washed equipment used on site and elsewhere, organic debris, drippings of motor and other types of oil from vehicles, and small paint chips from maintenance on diving equipment and boats. As DEQ is aware from their site visits, and from the information provided in EEM's Preliminary Assessment report dated June 28, 2001, there are no significant industrial activities that occur at this facility that should generate significantly higher than background concentrations of arsenic, cadmium, copper, lead and zinc.

Comparison of Total Metals Concentrations to DEQ Supplied Tables

At DEQ's request, EEM has reviewed the concentrations of total metals detected in the catch basin and sub-surface soil samples to information provided in four regulatory agency tables.

- The Washington Department of Ecology (WDOE) table shows background levels for numerous metals in various regions of the state. EEM reviewed the levels for Clark County since it is closest to the subject property.
- The Level II Screening Level Values table from the Oregon DEQ Guidance for Ecological Assessment document.
- EPA's Preliminary Remediation Goals (PRG) table for soil for industrial sites.
- National Oceanographic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRT) For Freshwater Sediments

Clark County Background Levels

As indicated in Tables 2a and 2b, the detected concentrations of arsenic, cadmium, copper, lead and zinc in almost all of the catch basin debris samples and some of the sub-surface soils samples were higher than the background levels established by the Washington Department of Ecology for Clark County in southwestern Washington. While the comparison of FDDS sampling data to the Clark County data is interesting, EEM questions whether the Clark County information is particularly useful or valid to the subject property because the Mocks Bottom area is in effect "man made" and is comprised of sediments from the Willamette River in the area immediately adjacent to Portland's original commercial, industrial and vessel docking area. The possibility that the dredged sediments used to build Mocks Bottom could have already been impacted by pre-1940s commercial activities is very significant.

Additionally, the dredged sediments came from the Willamette River system which drains a large area of Oregon, much of which is comprised of volcanic rocks which often have varying concentrations of numerous naturally occurring metals. Clark County is influenced by the Columbia River which drains a substantially larger land mass than the Willamette River and can have a significantly different sediment composition.

DEQ Level II Screening Level Values Table

The DEQ Screening Level values were very similar to the Clark County Background Levels. As indicated in Table 2a, almost all of the detected concentrations of arsenic, cadmium, copper, lead and zinc in all four of the catch basin debris samples were higher than the screening levels established by DEQ for freshwater sediments. The samples from the three catch basins located adjacent to the maintenance and warehouse structures had higher concentrations than Catch Basin #4 which is located adjacent to the office building.

As indicated in Table 2b, only the copper and zinc in Soil Sample #1 location had concentrations higher than the screening levels established DEQ for freshwater sediments.

EPA Preliminary Remediation Goals for Industrial Soil

As indicated in Tables 2a and 2b, all of the detected concentrations of arsenic, cadmium, copper, lead and zinc in all of the catch basin debris samples and sub-surface soil samples were lower than the EPA Preliminary Remediation Goals.

National Oceanographic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SquiRT) For Freshwater Sediments

As indicated in Table 2a, the detected concentrations of copper, lead and zinc in three of the catch basin debris samples were higher than the reference table values for freshwater sediments. These samples were from the three catch basins located adjacent to the maintenance and warehouse structures and boat dock ramp.

As indicated in Table 2b, with the exception of arsenic in the Catch Basin #1 sample, all of the detected concentrations of arsenic, cadmium, copper, lead and zinc in all of the sub-surface soil samples were lower than the reference table values for freshwater sediments.

Comparison of Semi-Volatile Organic Compounds Concentrations to DEQ Supplied Tables

EEM has also reviewed the detected concentrations of semi-volatile organic compounds (SVOCs) detected in the catch basin and sub-surface soil samples to information provided in the DEQ and EPA tables previously discussed.

DEQ Level II Screening Level Values Table

At your request, EEM reviewed the SVOCs analytical results for the Catch Basin samples to the Freshwater Sediments section of the DEQ Level II Screening Level Values table. As indicated in Table 3a, of the few SVOCs detected in the catch basin samples, almost all were in excess of the DEQ values.

EEM subsequently reviewed the SVOCs analytical results for the sub-surface soil samples to the Terrestrial Receptors - Invertebrates section of the DEQ Level II Screening Level Values table. As indicated in Table 3b, only Fluorene had an assigned value in the DEQ table and it was not detected in any of the sub-surface samples.

EPA Preliminary Remediation Goals for Industrial Soil

As indicated in Table 3a, EEM reviewed the SVOCs analytical results for the Catch Basin samples against the Industrial Soil section of EPA's Preliminary Remediation Goals table. Only the 18.7 ppm of Bis(2-chloroisopropyl)ether was above the PRG values.

As indicated in Table 3b, EEM reviewed the SVOCs analytical results for the sub-surface soil samples against the Industrial Soil section of EPA's Preliminary Remediation Goals table. Only one SVOC was detected in all of the sub-surface soil samples and it did not exceed its PRG value.

National Oceanographic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SquiRT) For Freshwater Sediments

As indicated in Table 3a, several of the detected concentrations of SVOCs in the catch basin debris samples were higher than the reference table values for freshwater sediments. The samples which had concentrations of SVOCs that exceed the NOAA table were from two of the three catch basins located adjacent to the maintenance and warehouse structures and boat dock ramp. NO SVOCs were detected in Catch Basin #6.

As indicated in Table 3b, only one SVOC was detected in any of the sub-surface soil samples and it had not been assigned a reference value in the NOAA table.

**Comparison of Catch Basin and Sub-Surface Soil Sampling
Concentrations to Agency Collected Lagoon Sediment Sampling Data**

Catch Basin Samples

As indicated in Table 4a, the Total Metals and SVOC analytical data for the Catch Basin samples were compared to the analytical results for four lagoon sediments samples collected by EPA in 1997, as well as contaminant concentration values labeled as Apparent Portland Harbor Sediment Baseline Maximum Value.

It should be noted that many more contaminants were detected in the lagoon samples than any of the Catch Basin samples. In general, the concentrations of some of the Total Metals and SVOCs from the Catch Basin debris samples were higher than those detected in the lagoon samples. However, considering the two radically different sampling locations and environments, especially in light of the known significant sources of the contamination to the lagoon, a serious comparison between these two sets of contaminant concentrations is very questionable.

Sub-Surface Soil Samples

As indicated in Table 4b, the Total Metals and SVOC analytical data for the sub-surface soil samples were compared to the analytical results for four lagoon sediments samples as well as a contaminant concentration values labeled as Apparent Portland Harbor Sediment Baseline Maximum Value.

In general, the concentrations of Arsenic and Cadmium from the sub-surface soil samples were slightly higher than those detected in the lagoon samples. The concentrations of Copper, Lead and Zinc were usually lower than the lagoon samples. Other than the 81.7 ppb of Bis(2-ethylhexyl)phthalate detected in soil sample SS#1, no other SVOCs were detected in any of the soil samples. As a previously discussed, Bis(2-ethylhexyl)phthalate is a common contaminant found in numerous unrelated environments.

**Comparison of Catch Basin and Sub-Surface Soil Sampling
Concentrations to LPAH and HPAHs Values for Agency Collected
Lagoon Sediment Sampling Data**

At DEQ's request, EEM has plotted the Low Polynuclear Aromatic Hydrocarbons (LPAHs) and the High Polynuclear Aromatic Hydrocarbons (HPAHs) values of the Catch Basin debris samples and the sub-surface soil samples against the four lagoon sediments samples, as well as contaminant concentration values labeled as Apparent Portland Harbor Sediment Baseline Maximum Value.

As indicated in Table 5, it is apparent that there are no LPAH and HPAH values for the Sub-Surface soil samples and two of the Catch Basin samples. The LPAH and HPAH values for Catch Basins #3 and #4 are significantly lower than the values for the four lagoon samples and the Apparent Portland Harbor Sediment Baseline Maximum Value.

Conclusions

Sampling of sub-surface soil in the western open area of the FDDS site, and from four of the six catch basins at the site indicated that no PCBs were detected, and only minor concentrations of SVOCs and varying concentrations of arsenic, cadmium, copper, lead and zinc were detected.

With respect to the sampling analytical results, the locations sampled, site history and past and current utilization, it is EEM's opinion that activities at the Fred Devine Diving & Salvage site are not likely to have impacted the lagoon and the Willamette River. Rather, as discussed in the June 2001 Preliminary Assessment report, the contaminated sediments found in the adjacent lagoon and Willamette River have their origins from several other obvious and significant sources, such as ship building and repair work on Swan Island and the storm sewer out fall located immediately adjacent to the subject property.

Sub-Surface Soil

As previously discussed, the source of the sampled sub-surface soil at the site, as well as most of Mocks Bottom, is river dredge material from the area of the Willamette River adjacent to Portland's original commercial and industrial district. Therefore, the concentrations of any potential contaminants in the soil at the FDDS site must be viewed relevant to the original source and not necessarily as indicative of potential problems generated by the use of the property over the past 30 years.

The areas where all of the sub-surface soil samples were collected were covered with several inches of gravel and subsequently not likely to be exposed to erosion and transported into the lagoon and Willamette River. Therefore, these materials at the FDDS site should not be considered a source of contamination to the lagoon and river.

Catch Basins

With regard to the detected metals and SVOCs in the catch basin debris samples, the sources of these materials can obviously be varied. They may include washed in local soil, soil brought in from off site by vehicle tires, material from washed equipment used on site and elsewhere, organic debris, drippings of motor and other types of oil from moving and parked vehicles, and small paint chips from maintenance on diving equipment and boats. As DEQ is aware from their site visits, and from the information provided in EEM's Preliminary Assessment report dated June 28, 2001, there are no significant industrial activities that occur at this facility

that should generate significantly higher than background concentrations of arsenic, cadmium, copper, lead and zinc, and also petroleum hydrocarbons and chemicals.

With respect to the potential impact accumulated debris in the catch basins may have on the storm water flowing from the site into the storm water system, on June 18, 2002, EEM contacted Ms. Sabrina Alberg, an Environmental Technician with the City of Portland Bureau of Environmental Services (BES) and inquired if she had sampled the storm water from the FDDS site since the last known sampling date of February 21, 2001. She stated no sampling from the FDDS site had occurred since then and there were no plans to conduct any additional sampling in the near future.

During the completion of the 2001 Preliminary Assessments report, in a March 21, 2001, telephone conversation with Ms. Alberg, she stated that for the storm water sample collected on February 21, 2001, only the pH of the water was slightly out of parameters. She suggested that equipment washing activities may be the cause of the altered pH. On March 26, 2001, BES issued a letter report summarizing the sampling analytical results and their recommendations. The letter report confirmed that no petroleum contaminants were detected and that only the pH of the water was out of range. The pH was 4.9 and the bench mark range is 5.5 to 9.0. Based on those sampling analytical results, BES decided against requesting that DEQ require FDDS to acquire an NPDES permit for their site.

During a conversation on July 8, 2002, with Mr. John Holtrop, an Environmental Technician with BES's Industrial Stormwater Program, EEM discussed the low pH of the stormwater samples collected by them on February 21, 2001. Mr. Holtrop stated that some areas of Portland receive "acid rain" or rainfall that had lower than normal pH because of localized industrial or other factors affecting the air. Considering the location of the FDDS facility next to Portland's major industrial area, this would seem very logical. He suggested the next time anyone collects a sample of the stormwater discharge, that a sample of the rainwater also be collected and checked for pH.

In summary, because significant quantities of solids do not accumulate in the catch basins even over extended periods of time, and because FDDS periodically has the catch basins cleaned, and because much of the solid material in the basins appears to be organic debris, it does not appear that the six catch basins at the site generate water quality or sediment contamination problems for the lagoon or the Willamette River.

It is EEM's firm belief that the six catch basins at the FDDS have not been a source of any of the contamination to the water and the sediments in the lagoon or the Willamette River. Nor is it likely, considering the type of work that occurs there and the very high level of awareness of environmental issues that the tenants have (Foss Environmental and FDDS), that the six catch basins at the FDDS site will ever be a source of contaminants to the water and sediments in the lagoon and the river.

Proposed Site Actions

During the preparation of this report, DEQ made several suggestions to EEM regarding source control measures that could be taken at the site to help prevent storm water from the FDDS site from impacting the lagoon and river. These suggestions are discussed in the following text.

NPDES Permit

With regard to DEQ's suggestion that FDDS obtain a National Pollutant Discharge Elimination System (NPDES) permit for the site, EEM has discussed this with FDDS management and no decision has been made yet. Currently, the FDDS site is overseen by the City of Portland Bureau of Environmental Services (BES). During my conversation with BES in 2001 and 2002, that agency does not appear to be inclined to continue to recommend FDDS to obtain an NPDES permit for their site.

Site Best Management Practices

Because of the nature of their business, Fred Devine Diving & Salvage personnel are already very aware of potential environmental impacts of their work. However, since DEQ has suggested that FDDS look for ways to further reduce or eliminate the potential for releases or impacts to the lagoon and the river, EEM has proposed several "Best Management Practices" to FDDS management.

- In the past, the cleaning of the catch basins has occurred reasonably often, but not on a scheduled basis and the work has not always been documented in an adequate manner. EEM has proposed to FDDS management that all of the catch basins be cleaned out four times a year and the removed solids be stored on-site in 55 gallon drums until enough material has accumulated to dispose of at a sanitary landfill. FDDS has agreed to this proposal. The catch basins were last cleaned out after EEM's sampling on April 30, 2002. Therefore the next cleaning interval will be on July 30, 2002 and every 3 months after that.
- Absorbent booms will be replaced in each catch basin each quarter.

- FDDS employees will be instructed to not to wash surface debris or spilled fluids from inside the shop and areas immediately adjacent to the buildings into the catch basins. Instead, paint chips, dirt and other solids will be collected with a shop vacuum cleaner. Highly visible signs will be placed in several locations inside and outside the shop buildings with instructions about sweeping up and vacuuming loose materials. The vacuumed solids will be placed in a disposal bin or the 55 gallon drums used to store catch basin debris.
- Spill kits are already located at several locations at the FDDS site and of course it is exceptionally convenient that Foss Environmental is located on site.
- Drip pans will be placed under any long term parked vehicles that are identified as having oil leakage problems.
- No chlorinated solvents or petroleum products will be used to wash vehicles or other equipment which may have direct or indirect runoff into the catch basins or in the open gravel covered area. The facility already has a self contained solvents based parts washer inside the FDDS maintenance shop area.
- Every catch basin will have the "Dump No Waste - Drains to Stream" stencil painted next to it.
- A copy of the document entitled *Environmentally Responsible Best Management Practices* will be reviewed with all employees and they will be given a copy for reference.

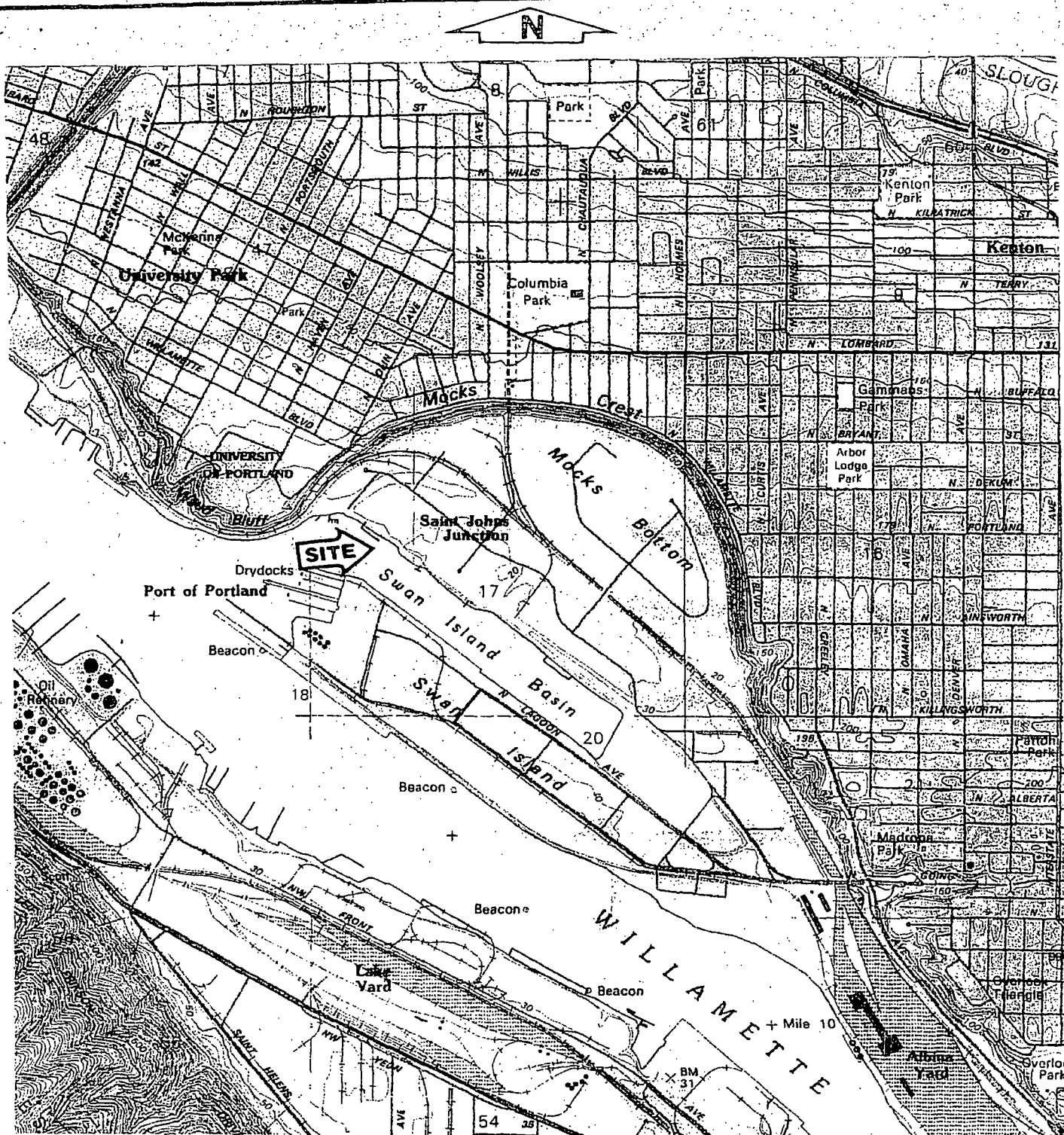
FDDS has complied with DEQ's request for sub-surface soil and catch basin debris sampling analytical information, as well as implementing additional Best Management Practices at the subject property. If you have any comments or questions regarding the information presented in this letter report, please contact me at 503-985-1717.

Sincerely,

David L. Samples R.P.G.
Oregon Registered Professional Geologist

Attachments: Figures 1, 2, 3 and 4
 1942 Aerial Photograph
 Tables 1, 2, 3, 4 and 5
 Laboratory Reports and Chain-of-Custody

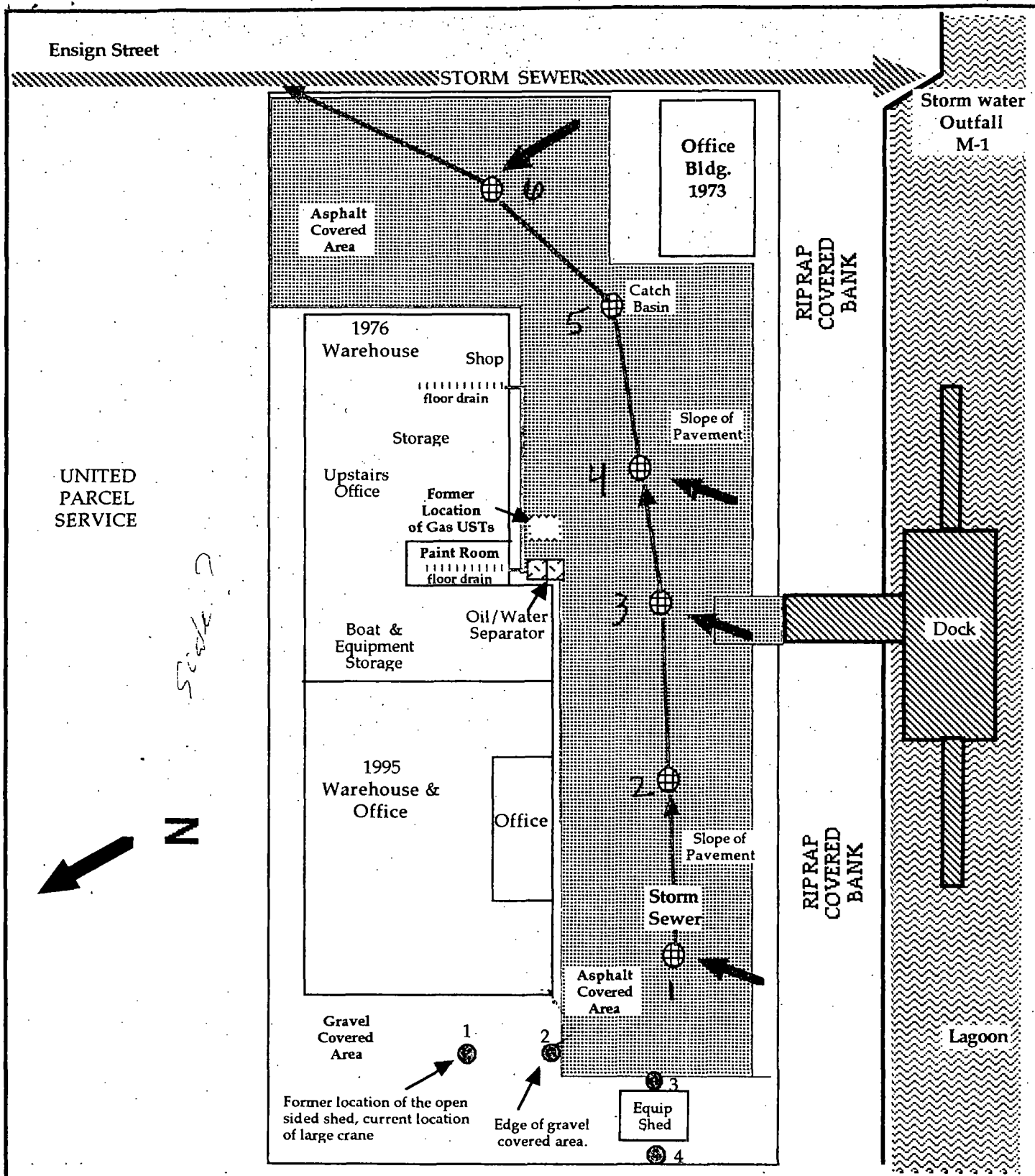
cc Mick Leitz, Fred Devine Diving & Salvage
 Todd Zilbert, Wood Tatum Sanders & Murphy



USGS Map Portland OR Quadrangle (Photo-Revised in 1990) Scale is 1 Inch equals 2,000 Feet

**EVERGREEN
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FIGURE NO. 1 Project #01-06
Project Location Map
Fred Devine Diving & Salvage Facility
6211 N Ensign Drive
Portland, Oregon



**EVERGREEN
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Beaverton, OR 97075-1604

FIGURE NO. 2 Project #01-06
Project Site Map
Fred Devine Diving & Salvage Facility
6211 N Ensign Drive
Portland, Oregon

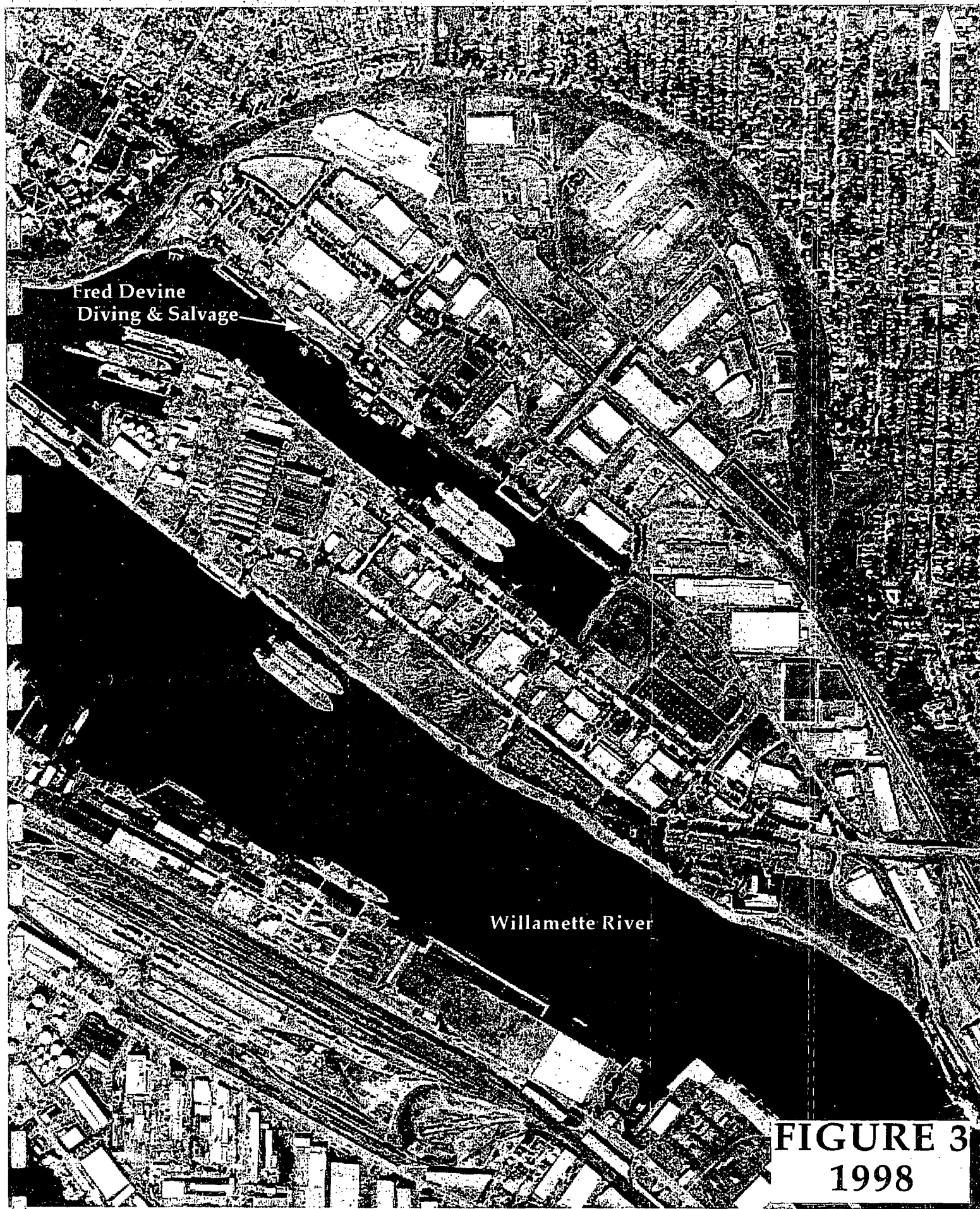


FIGURE 3
1998

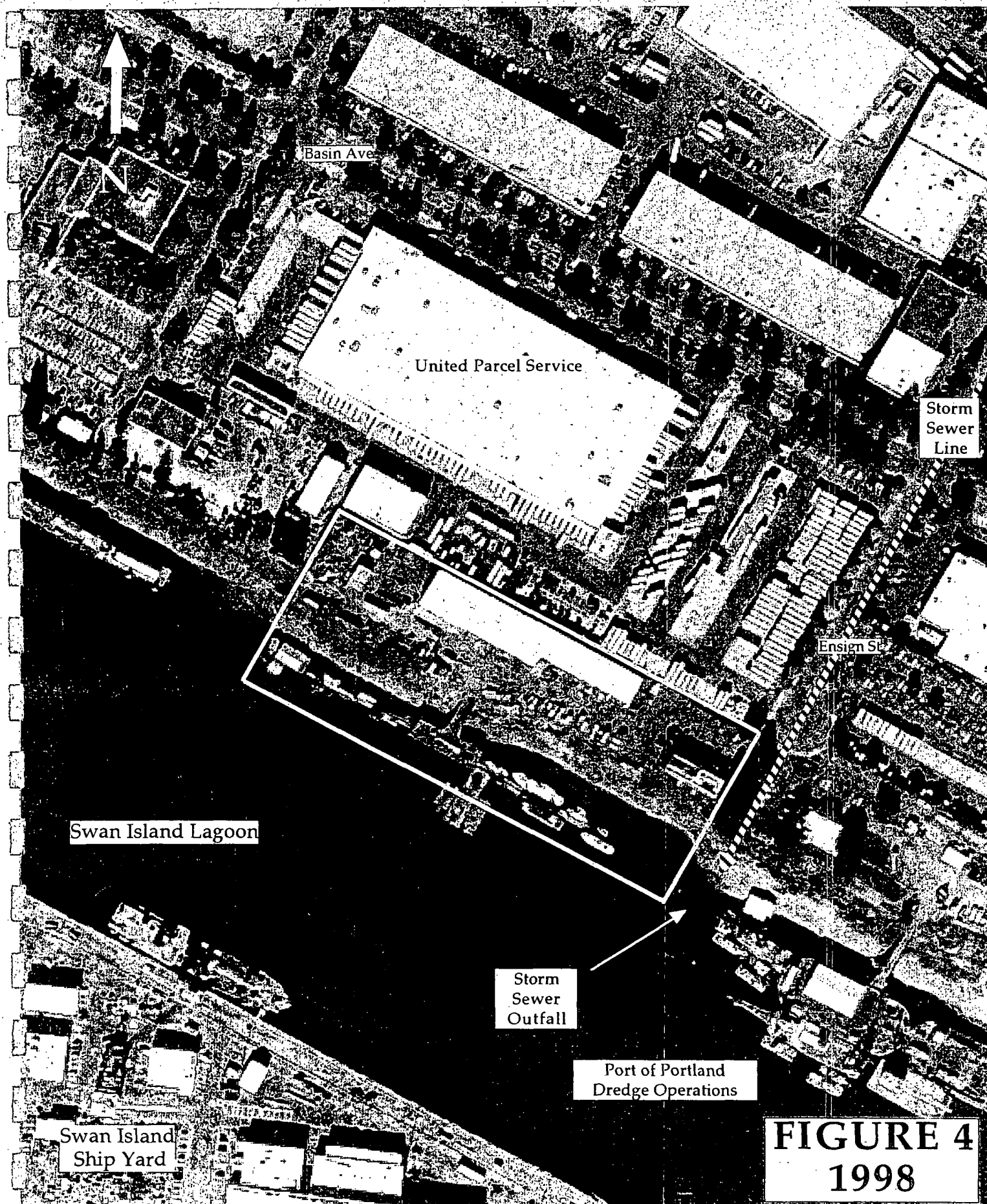


FIGURE 4
1998

TABLE 1
SOIL SAMPLING ANALYTICAL RESULTS
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Sample Identification	Date Collected	PCBs _a parts per billion	BNA Semi-Volatile Organic Compound _b parts per million	Total Metals _c parts per million
Catch Basin #1	4/30/02	ND _d	Bis(2-ethylhexyl)phthalate - 27.6 ✓	Arsenic - 16.7 ✓ Cadmium - 2.25 ✓ Copper - 206 ✓ Lead - 228 226 ✓ Zinc - 477 ✓
Catch Basin #3	4/30/02	ND	Bis(2-ethylhexyl)phthalate - 172 ✓ Fluoranthene - 15.3 16.3 ✓ Phenanthrene - 12.1 ✓ Pyrene - 5.90 8.9 18.7 ✓	Arsenic - 5.98 ✓ Cadmium - 2.76 ✓ Copper - 172 ✓ Lead - 176 ✓ Zinc - 365 ✓
Catch Basin #4	4/30/02	ND	Bis(2-ethylhexyl)phthalate - 27.2 Bis(2-chloroisopropyl)ether - 48.7 butylbenzyl phthalate - 27.2 ✓ Anthracene - 16.7 ✓ Fluoranthene - 18.7 ✓ Fluorene - 6.73 ✓ Phenanthrene - 20 ✓ Pyrene - 12.5 ✓	Arsenic - 9.05 ✓ Cadmium - 3.47 ✓ Copper - 202 ✓ Lead - 253 283 ✓ Zinc - 488 ✓
Catch Basin #6	4/30/02	ND	ND	Arsenic - 2.71 ✓ Cadmium - ND ✓ Copper - 85.5 ✓ Lead - 66.6 ✓ Zinc - 236 ✓
SS #1	4/30/02	ND	Bis(2-ethylhexyl)phthalate - 0.0817 ✓	Arsenic - 17.9 ✓ Cadmium - 1.45 ✓ Copper - 98.8 ✓ Lead - 57.6 ✓ Zinc - 288 ✓
SS #2	4/30/02	ND	ND	Arsenic - 2.12 ✓ Cadmium - ND ✓ Copper - 19.7 ✓ Lead - 3.59 ✓ Zinc - 47.7 ✓
SS #3	4/30/02	ND	ND	Arsenic - 5.07 ✓ Cadmium - 1.35 ✓ Copper - 33.2 ✓ Lead - 10.2 ✓ Zinc - 97.5 ✓
SS #4	4/30/02	ND	ND	Arsenic - 2.53 Cadmium - ND Copper - 39.2 Lead - 25.7 Zinc - 164

- 50-
- a Polychlorinated Biphenyls by EPA Method 8082A. Method Detection Level was 500 parts per billion.
 - b BNA Semi-Volatile Organics by EPA Method 8270C. Method Detection Levels ranged from 6.7 to 13.4 parts per million.
 - c Total Metals by EPA 6010B. Method Detection Level was 1.0 ppm.
 - d ND = None Detected above Method Detection Levels.

067

TABLE 2a
COMPARISON OF CATCH BASIN DEBRIS SAMPLING ANALYTICAL RESULTS
FOR TOTAL METALS TO DEQ SUPPLIED DATA
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Sample Identification	Date Collected	Clark County, Washington Natural Metals Background Levels Parts per Million	Total Metals parts per million	DEQ Level II Screening Level Values for Freshwater Sediments	Total Metals parts per million	EPA Preliminary Remediation Goals Industrial Soil parts per million	Total Metals parts per million	NOAA SQUIRTa Values Freshwater Sediment parts per billion	Total Metals Originally reported in parts per million but converted to parts per billion for comparison purposes
Catch Basin #1	4/30/02	Arsenic - 6.0 ✓ Cadmium - 1.0 Copper - 34.0 Lead - 17.0 Zinc - 96	Arsenic - 16.7 ✓ Cadmium - 2.25 ✓ Copper - 206 ✓ Lead - 228 22b Zinc - 477 ✓	Arsenic - 6.0 ✓ Cadmium - 0.6 ✓ Copper - 36.0 ✓ Lead - 35.0 ✓ Zinc - 123 ✓	Arsenic - 16.7 Cadmium - 2.25 Copper - 206 Lead - 228 Zinc - 477	Arsenic - 440 Cadmium - 810 Copper - 76,000 Lead - 750 Zinc - 10,000	Arsenic - 16.7 Cadmium - 2.25 Copper - 206 Lead - 228 Zinc - 477	Arsenic - 17,000 Cadmium - 3,530 Copper - 197,000 Lead - 91,300 Zinc - 315,000	Arsenic - 16,700 Cadmium - 2,250 Copper - 206,000 Lead - 228,000 Zinc - 477,000
Catch Basin #3	4/30/02		Arsenic - 5.98 ✓ Cadmium - 2.765 Copper - 172 ✓ Lead - 176 ✓ Zinc - 365 ✓		Arsenic - 5.98 Cadmium - 2.76 Copper - 172 Lead - 176 Zinc - 365		Arsenic - 5.98 Cadmium - 2.76 Copper - 172 Lead - 176 Zinc - 365		Arsenic - 5,980 Cadmium - 2,760 Copper - 172,000 Lead - 176,000 Zinc - 365,000
Catch Basin #4	4/30/02		Arsenic - 9.05 Cadmium - 3.47 Copper - 202 Lead - 253 283 Zinc - 488		Arsenic - 9.05 Cadmium - 3.47 Copper - 202 Lead - 253 Zinc - 488		Arsenic - 9.05 Cadmium - 3.47 Copper - 202 Lead - 253 Zinc - 488		Arsenic - 9,050 Cadmium - 3,470 Copper - 202,000 Lead - 253,000 Zinc - 488,000
Catch Basin #6	4/30/02		Arsenic - 2.71 ✓ Cadmium - ND ✓ Copper - 85.5 ✓ Lead - 66.6 ✓ Zinc - 236 ✓		Arsenic - 2.71 Cadmium - ND Copper - 85.5 Lead - 66.6 Zinc - 236		Arsenic - 2.71 Cadmium - ND Copper - 85.5 Lead - 66.6 Zinc - 236		Arsenic - 2,710 Cadmium - ND Copper - 85,500 Lead - 66,600 Zinc - 236,000

GREEN TEXT INDICATES AGENCY TABLE VALUES

RED TEXT INDICATES WHICH SAMPLING ANALYTICAL RESULT IS IN EXCESS OF THAT AGENCY'S TABLE VALUE

- a. Polychlorinated Biphenyls by EPA Method 8082A. Method Detection Level was 500 parts per billion.
- b. BNA Semi-Volatile Organics by EPA Method 8270C. Method Detection Levels ranged from 6.7 to 13.4 parts per million.
- c. Total Metals by EPA 6010B. Method Detection Level was 1.0 ppm.
- d. ND = None Detected above Method Detection Levels.

TABLE 2b
COMPARISON OF SUB-SURFACE SOIL SAMPLING ANALYTICAL RESULTS
FOR TOTAL METALS TO DEQ SUPPLIED DATA
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Sample Identification	Date Collected	Clark County, Washington Natural Metals Background Levels Parts per Million	Total Metals parts per million	DEQ Level II Screening Level Values for Soil Terrestrial Receptors - Invertebrates parts per million <i>DECS</i>	Total Metals parts per million	EPA Preliminary Remediation Goals Industrial Soil parts per million	Total Metals parts per million	NOAA SQUIRTa Values Freshwater Sediment parts per billion	Total Metals Originally reported in parts per million but converted to parts per billion for comparison purposes
SS #1	4/30/02	Arsenic - 6.0 Cadmium - 1.0 Copper - 34.0 Lead - 17.0 Zinc - 96	Arsenic - 17.9 ✓ Cadmium - 1.45 ✓ Copper - 98.8 ✓ Lead - 57.6 ✓ Zinc - 288 ✓	Arsenic - 60 ³³ Cadmium - 20 ^{4.9%} Copper - 50 ¹⁴⁹ Lead - 500 ¹²⁸ Zinc - 200 ⁴⁵⁹	Arsenic - 17.9 Cadmium - 1.45 Copper - 98.8 Lead - 57.6 Zinc - 288	Arsenic - 440 ✓ Cadmium - 810 ✓ Copper - 76,000 ✓ Lead - 750 ✓ Zinc - 10,000 ✓	Arsenic - 17.9 Cadmium - 1.45 Copper - 98.8 Lead - 57.6 Zinc - 288	Arsenic - 17,000 Cadmium - 3,530 Copper - 197,000 Lead - 91,300 Zinc - 315,000	Arsenic - 17,900 Cadmium - 1,450 Copper - 98,800 Lead - 57,600 Zinc - 288,000
SS #2	4/30/02		Arsenic - 2.12 ✓ Cadmium - ND ✓ Copper - 19.7 ✓ Lead - 3.59 ✓ Zinc - 47.7 ✓		Arsenic - 2.12 Cadmium - ND Copper - 19.7 Lead - 3.59 Zinc - 47.7		Arsenic - 2.12 Cadmium - ND Copper - 19.7 Lead - 3.59 Zinc - 47.7		Arsenic - 2,120 Cadmium - ND Copper - 19,700 Lead - 3,590 Zinc - 47,700
SS #3	4/30/02		Arsenic - 5.07 ✓ Cadmium - 1.35 ✓ Copper - 33.2 ✓ Lead - 10.2 ✓ Zinc - 97.5 ✓		Arsenic - 5.07 Cadmium - 1.35 Copper - 33.2 Lead - 10.2 Zinc - 97.5		Arsenic - 5.07 Cadmium - 1.35 Copper - 33.2 Lead - 10.2 Zinc - 97.5		Arsenic - 5,070 Cadmium - 1,350 Copper - 33,200 Lead - 10,200 Zinc - 97,500
SS #4	4/30/02		Arsenic - 2.53 ✓ Cadmium - ND ✓ Copper - 39.2 ✓ Lead - 25.7 ✓ Zinc - 164 ✓		Arsenic - 2.53 Cadmium - ND Copper - 39.2 Lead - 25.7 Zinc - 164		Arsenic - 2.53 Cadmium - ND Copper - 39.2 Lead - 25.7 Zinc - 164		Arsenic - 2,530 Cadmium - ND Copper - 39,200 Lead - 25,700 Zinc - 164,000

GREEN TEXT INDICATES AGENCY TABLE VALUES

RED TEXT INDICATES WHICH SAMPLING ANALYTICAL RESULT IS IN EXCESS OF THAT AGENCY'S TABLE VALUE

- a. Polychlorinated Biphenyls by EPA Method 8082A. Method Detection Level was 500 parts per billion.
- b. BNA Semi-Volatile Organics by EPA Method 8270C. Method Detection Levels ranged from 6.7 to 13.4 parts per million.
- c. Total Metals by EPA 6010B. Method Detection Level was 1.0 ppm.
- d. ND = None Detected above Method Detection Levels.

TABLE 3b
COMPARISON OF SUB-SURFACE SOIL SAMPLING ANALYTICAL RESULTS
FOR SEMI-VOLATILE ORGANIC COMPOUNDS TO DEQ SUPPLIED DATA
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Sample Identification	Date Collected	DEQ Level II Screening Level Values for Soil Terrestrial Receptors - Invertebrates parts per million	BNA Semi-Volatile Organic Compounds Originally reported in parts per million but converted to parts per billion for comparison purposes	EPA Preliminary Remediation Goals Industrial Soil parts per million	BNA Semi-Volatile Organic Compounds parts per million	NOAA SQUIRTs Values Freshwater Sediment parts per billion	BNA Semi-Volatile Organic Compounds Originally reported in parts per million but converted to parts per billion for comparison purposes
SS #1	4/30/02	Bis(2-ethylhexyl)phthalate - NA Bis(2-chloroisopropyl)ether - NA Anthracene - NA Fluoranthene - NA Fluorene - 30 Phenanthrene - NA Pyrene - NA	Bis(2-ethylhexyl)phthalate - 81.7 ✓	Bis(2-ethylhexyl)phthalate - 180 Bis(2-chloroisopropyl)ether - 8.1 Anthracene - 100,000 Fluoranthene - 30,000 Fluorene - 33,000 Phenanthrene - NA Pyrene - 54,000	Bis(2-ethylhexyl)phthalate - 0.0817	Bis(2-ethylhexyl)phthalate - NA Bis(2-chloroisopropyl)ether - NA Anthracene - NA Fluoranthene - 2,355 Fluorene - NA Phenanthrene - 515 Pyrene - 875	Bis(2-ethylhexyl)phthalate - 0.0817
SS #2	4/30/02		ND		ND		ND
SS #3	4/30/02		ND		ND		ND
SS #4	4/30/02		ND		ND		ND

GREEN TEXT INDICATES AGENCY TABLE VALUES

RED TEXT INDICATES WHICH SAMPLING ANALYTICAL RESULT IS IN EXCESS OF THAT AGENCY'S TABLE VALUE

TABLE 3a

Fred Devine Salvage

Sample Identification	Date Collected	DEQ Level II Screening Level Values for Freshwater Sediments parts per billion	BNA Semi-Volatile Organic Compounds Originally reported in parts per million but converted to parts per billion for comparison purposes	EPA Preliminary Remediation Goals Industrial Soil parts per million	BNA Semi-Volatile Organic Compounds parts per million	NOAA SQUIRTS Values Freshwater Sediment parts per billion	BNA Semi-Volatile Organic Compounds Originally reported in parts per million but converted to parts per billion for comparison purposes
Catch Basin #1	4/30/02	Bis(2-ethylhexyl)phthalate - 750 ✓ Bis(2-chloroisopropyl)ether - NA ✓ Butyl benzyl phthalate - NA ✓ Anthracene - 57 ✓ Fluoranthene - 111 ✓ Fluorene - 77 ✓ Phenanthrene - 42 ✓ Pyrene - 53 ✓ 845 21200 536 1170 11520	Bis(2-ethylhexyl)phthalate - 27,600 ✓	Bis(2-ethylhexyl)phthalate - 180 ✓ Bis(2-chloroisopropyl)ether - 8.1 ✓ Butyl benzyl phthalate - 100,000 ✓ Anthracene - 100,000 ✓ Fluoranthene - 30,000 ✓ Fluorene - 33,000 ✓ Phenanthrene - Not Listed ✓ Pyrene - 54,000 ✓	Bis(2-ethylhexyl)phthalate - 27.6	Bis(2-ethylhexyl)phthalate - NA Bis(2-chloroisopropyl)ether - NA Anthracene - NA Fluoranthene - 2,355 Fluorene - NA Phenanthrene - 515 Pyrene - 875	Bis(2-ethylhexyl)phthalate - 27,600
Catch Basin #3	4/30/02		Bis(2-ethylhexyl)phthalate - 172,000 ✓ Fluoranthene - 15,300 ✓ Phenanthrene - 12,100 ✓ Pyrene - 5,900 ✓ 161300 8900		Bis(2-ethylhexyl)phthalate - 172 Fluoranthene - 15.3 Phenanthrene - 12.1 Pyrene - 5.90	 same	Bis(2-ethylhexyl)phthalate - 172,000 Fluoranthene - 15,300 Phenanthrene - 12,100 Pyrene - 5,900
Catch Basin #4	4/30/02		Bis(2-ethylhexyl)phthalate - 27,200 ✓ Bis(2-chloroisopropyl)ether - 18,700 ✓ Butyl benzyl phthalate - 27,200 ✓ Anthracene - 16,700 ✓ Fluoranthene - 18,700 ✓ Fluorene - 6,730 ✓ Phenanthrene - 20,000 ✓ Pyrene - 12,500 ✓ 18700	same	Bis(2-ethylhexyl)phthalate - 27.2 ✓ Bis(2-chloroisopropyl)ether - 18.7 ✓ Anthracene - 16.7 Fluoranthene - 18.7 Fluorene - 6.73 Phenanthrene - 20 Pyrene - 12.5		Bis(2-ethylhexyl)phthalate - 27,200 Bis(2-chloroisopropyl)ether - 18,700 Anthracene - 16,700 Fluoranthene - 18,700 Fluorene - 6,730 Phenanthrene - 20,000 Pyrene - 12,500
Catch Basin #6	4/30/02		ND		ND		ND

GREEN TEXT INDICATES AGENCY TABLE VALUES

RED TEXT INDICATES WHICH SAMPLING ANALYTICAL RESULT IS IN EXCESS OF THAT AGENCY'S TABLE VALUE

TABLE 4a
COMPARISON OF CATCH BASIN SAMPLING ANALYTICAL RESULTS TO
AGENCY COLLECTED LAGOON SEDIMENT SAMPLING DATA
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Contaminant	Catch Basin #1	Catch Basin #3	Catch Basin #4	Catch Basin #6		Northwest SD129	PSY12	SD136	SD136C	Apparent Portland Harbor Sediment Baseline Maximum Value
PCBs (parts per billion)	ND	ND	ND	ND		NA	ND	NA	NA	<180
Total Metals (parts per million)										
Arsenic	16.7 ✓	5.98 ✓	9.05 ✓	2.71 ✓		<6 ✓	17 ✓	<7	<4	<5 ✓
Cadmium	2.25 ✓	2.75 ✓	3.47 ✓	ND ✓		0.7 ✓	0.4 ✓	1 ✓	0.8 ✓	0.6 ✓
Copper	206 ✓	172 ✓	202 ✓	85.5 ✓		131 ✓	119 ✓	82 ✓	43 ✓	60 ✓
Lead	228 ✓	176 ✓	253 ✓	66.6 ✓		38 ✓	27 ✓	24 ✓	27 ✓	30 ✓
Zinc	477 ✓	365 ✓	488 ✓	236 ✓		279 ✓	264 ✓	178 ✓	116 ✓	118 ✓
Semi-Volatile Organic Compounds (parts per billion)								2,100		
Bis(2-ethylhexyl)phthalate*	27,600 ✓	172,000 ✓	18,700	ND		760	440	2,100	370	Not Listed 390
Bis(2-chloroisopropyl)ether*	ND	ND	18,700	ND		ND 74	ND	ND	ND	Not Listed <20
Anthracene*	ND	ND	16,700	ND		ND	ND	ND	ND	Not Listed
Fluoranthene*	ND	13,300	18,700	ND		ND	ND	ND	ND	Not Listed
Fluorene*	ND	ND	6,730	ND		ND	ND	ND	ND	Not Listed
Phenanthrene*	ND	12,100	20,000	ND		ND	ND	ND	ND	Not Listed
Pyrene*	ND	4,900	12,500	ND		ND	ND	ND	ND	Not Listed
		8								
2-Methylnaphthalene	ND	ND	ND	ND		26 ✓	20 ✓	<19 ✓	<19 ✓	150 ✓
4-Methylphenol	ND	ND	ND	ND		1,100 ✓	NA ✓	380 ✓	<19 ✓	680 ✓
Benzoic Acid	ND	ND	ND	ND		<190 ✓	NA ✓	<190 ✓	<190 ✓	<200 ✓

Bis(2-ethylhexyl)phthalate
 Bis(2-chloroisopropyl)ether

Contaminant	Catch Basin #1	Catch Basin #3	Catch Basin #4	Catch Basin #6		Northwest SD129	PSY12	SD136	SD136C	Apparent Portland Harbor Sediment Baseline Maximum Value
Benzyl Alcohol	ND	ND	ND	ND		<19	NA	<19	<19	<20
Butylbenzylphthalate	ND	ND	ND	ND		74	<10	62	<19	<20
Carbazole	ND	ND	ND	ND		25	NA	<19	<19	100
Di-N-Butylphate	ND	ND	ND	ND		51	<10	<19	44	<20
Di-N-Octylphthalate	ND	ND	ND	ND		<19	13	<19	<19	<20
Dibenzofuran	ND	ND	ND	ND		20	26	<19	<19	100
Dimethylphthalate	ND	ND	ND	ND		<19	<10	<19	<19	<20
Pentachlorophenol	ND	ND	ND	ND		<96	<100	<96	<97	Detect
Phenol	ND	ND	ND	ND		<19	<50	<19	<19	<20

* Originally reported in Parts per Million. Converted to Parts per Billion for comparison purposes

TABLE 4b
COMPARISON OF SUB-SURFACE SOIL SAMPLING ANALYTICAL RESULTS TO
AGENCY COLLECTED LAGOON SEDIMENT SAMPLING DATA
Fred Devine Salvage
6211 N. Ensign Street, Portland, Oregon

Contaminant	SS #1	SS #2	SS #3	SS #4		Northwest SD129	PSY12	SD136	SD136C	Apparent Portland Harbor Sediment Baseline Maximum Value
PCBs (parts per billion)	ND	ND	ND	ND		NA	ND	NA	NA	<180
Total Metals (parts per million)										
Arsenic	17.9 ✓	2.12 ✓	5.07 ✓	2.53 ✓		<6	17	<7	<4	<5
Cadmium	1.45 ✓	ND ✓	1.35 ✓	ND ✓		0.7	0.4	1	0.8	0.6
Copper	98.8 ✓	19.7 ✓	33.2 ✓	39.2 ✓		131	119	82	43	60
Lead	57.6 ✓	3.59 ✓	10.2 ✓	25.7 ✓		38	27	24	27	30
Zinc	288 ✓	47.7 ✓	97.5 ✓	164 ✓		279	264	178	116	118
Semi-Volatile Organic Compounds (parts per billion)										
Bis(2-ethylhexyl)phthalate*	81.7	ND	ND	ND		760	440	2.100	370	Not Listed
Bis(2-chloroisopropyl)ether*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
Anthracene*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
Fluoranthene*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
Fluorene*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
Phenanthrene*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
Pyrene*	ND	ND	ND	ND		ND	ND	ND	ND	Not Listed
2-Methylnaphthalene	ND	ND	ND	ND		26	20	<19	<19	150
4-Methylphenol	ND	ND	ND	ND		1,100	NA	380	<19	680
Benzoic Acid	ND	ND	ND	ND		<190	NA	<190	<190	<200

Contaminant	SS #1	SS #2	SS #3	SS #4		Northwest SD129	PSY12	SD136	SD136C	Apparent Portland Harbor Sediment Baseline Maximum Value
Benzyl Alcohol	ND	ND	ND	ND		<19	NA	<19	<19	<20
Butylbenzylphthalate	ND	ND	ND	ND		74	<10	62	<19	<20
Carbazole	ND	ND	ND	ND		25	NA	<19	<19	100
Di-N-Butylphate	ND	ND	ND	ND		51	<10	<19	44	<20
Di-N-Octylphthalate	ND	ND	ND	ND		<19	13	<19	<19	<20
Dibenzofuran	ND	ND	ND	ND		20	26	<19	<19	100
Dimethylphthalate	ND	ND	ND	ND		<19	<10	<19	<19	<20
Pentachlorophenol	ND	ND	ND	ND		<96	<100	<96	<97	Detect
Phenol	ND	ND	ND	ND		<19	<50	<19	<19	<20

* Originally reported in Parts per Million. Converted to Parts per Billion for comparison purposes

PPM
22.8.72 J. L. G. M.
PEC

0	0
0.433	2.474
2.433	17.268
.129	1.025
.061	0.577
0.700	2.400

- a Polychlorinated Biphenyls by EPA Method 8082A. Method Detection Level was 500 parts per billion.
- b BNA Semi-Volatile Organics by EPA Method 8270C. Method Detection Levels ranged from 6.7 to 13.4 parts per million.
- c Total Metals by EPA 6010B. Method Detection Level was 1.0 ppm.
- d ND = None Detected above Method Detection Levels.